

REVISED DRAFT
SECTION II. ZONE DATA SUMMARIES

ZONE 1

Zone 1 Description

Zone 1 is the Sacramento River watershed that drains the northern part of the Central Valley into the Sacramento River. It supports approximately 2,152,000 acres of irrigated agriculture using both surface and groundwater for irrigation. Zone 1 includes irrigated lands within the geographic areas represented by the Sacramento Valley Water Quality Coalition (SVWQC) (which is subdivided into 10 subwatersheds), the Goose Lake Coalition, and the California Rice Commission. The California Rice Commission drainages are included within the SVWQC area, but are focused on acres planted predominantly with rice.

Pesticide Use information for Zone 1 is summarized in Appendix B. The Appendix lists the primary crops by acreage that were grown in 2005 sorted by county. The Appendix also references a selection of the types and quantity of pesticides that are recorded as being used for these crops (Department of Pesticide Regulation for 2005).

Table Z1-1 identifies the CWA 303(d) listed water bodies within Zone 1 that have sources listed as agriculture or unknown toxicity that could be related to agricultural operations. Note that some listed constituents are no longer registered for use.

Table Z1-1
Summary of 303 (d) listed analytes by subwatershed areas

Listed Water Body	Subwatershed Area	Constituent
Butte Slough	Butte/Yuba/Sutter	Diazinon
Delta Waterways, northern portion	Butte/Yuba/Sutter Placer/Nevada/S. Sutter/N. Sacramento Sacramento/Amador	Chlorpyrifos DDT Diazinon Group A Pesticides PCBs Unknown toxicity
Delta Waterways; northwestern portion	Butte/Yuba/Sutter Placer/Nevada/S. Sutter/N. Sacramento Sacramento/Amador	Chlorpyrifos DDT Diazinon EC Group A Pesticides Unknown toxicity
Feather River, Lower (Lake Oroville Dam to Confluence with Sacramento River)	Butte/Yuba/Sutter	Chlorpyrifos Group A Pesticides Unknown toxicity Diazinon
Main Drainage Canal	Butte/Yuba/Sutter	Diazinon
Wadsworth Canal	Butte/Yuba/Sutter	Diazinon
Colusa Basin Drain	Colusa Basin	Azinphos-methyl Malathion Carbofuran Methyl parathion Diazinon Molinate/ordram Group A Pesticides Unknown toxicity
Jack Slough	Colusa Basin	Diazinon
Sacramento River (Knights Landing to the Delta)	Colusa Basin Solano/Yolo Butte/Yuba/Sutter Placer/Nevada/S. Sutter/N.	Diazinon

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Listed Water Body	Subwatershed Area	Constituent
	Sacramento Sacramento/Amador	
Sacramento River (Red Bluff to Knights Landing)	Colusa Basin Drain Butte/Yuba/Sutter Solano/Yolo Placer/Nevada/S. Sutter/N. Sacramento Sacramento/Amador	Unknown toxicity
American River, Lower (Nimbus Dam to confluence with Sacramento River)	El Dorado	Unknown toxicity
Cache Creek, Lower (Clear Lake to the Settling Basin near Yolo Bypass)	Lake/Napa Solano/Yolo	Unknown Toxicity
Clear Lake	Lake/Napa	Nutrients
Fall River	Pit River	Sedimentation/siltation
Pit River	Pit River	Nutrients Organic enrichment/low dissolved oxygen Water temperature
Arcade Creek	Placer/Nevada/S. Sutter/N. Sacramento	Diazinon
Bear River, Lower (below Camp Far West Reservoir)	Placer/Nevada/S. Sutter/N. Sacramento	Diazinon
Chicken Ranch Slough	Placer/Nevada/S. Sutter/N. Sacramento	Diazinon
Morrison Creek	Placer/Nevada/S. Sutter/N. Sacramento	Chlorpyrifos Diazinon
Natomas East Main Drainage Canal (aka Steelhead Creek, downstream of confluence with Arcade Creek)	Placer/Nevada/S. Sutter/N. Sacramento	Diazinon PCBs
Natomas East Main Drainage Canal (aka Steelhead Creek, upstream of confluence with Arcade Creek)	Placer/Nevada/S. Sutter/N. Sacramento	PCBs
Strong Ranch Slough	Placer/Nevada/S. Sutter/N. Sacramento	Diazinon
Wolf Creek	Placer/Nevada/S. Sutter/N. Sacramento	Fecal coliform
Elder Creek	Sacramento/Amador	Diazinon
Elk Grove Creek	Sacramento/Amador	Diazinon
Lower Bear River Reservoir	Sacramento/Amador	Copper
Clover Creek Oak Run Creek South Cow Creek	Shasta/Tehama	Fecal coliform
Sacramento River (Cottonwood Creek to Red Bluff)	Shasta/Tehama Butte/Yuba/Sutter	Unknown toxicity
Sacramento River (Keswick Dam to Cottonwood Creek)	Shasta/Tehama Butte/Yuba/Sutter	Unknown toxicity

A general description of the nine SVWQC subwatersheds and Goose Lake is provided below.

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Butte/Yuba/Sutter Subwatershed. This subwatershed encompasses portions of Butte, Yuba and Sutter counties. The major land uses include agriculture and grazing. Major agricultural crops include orchards (almonds, walnuts, peaches, prunes, and olives), row crops (beans and tomatoes), rice, alfalfa, and pasture. The main crops in this subwatershed include rice, walnut, almonds, prunes, peaches, pears and tomatoes. The major pesticides applied in Butte/Yuba/Sutter Subwatershed, based on weight, were copper compounds, propanil, mineral oil/petroleum distillates, and sulfur (California Pesticide Information Portal, California Department of Pesticide Regulation, 2005 database update). There are four 303(d) listed waterbodies in the Butte/Yuba/Sutter Subwatershed (Table Z1-1). Butte Slough, Wadsworth Canal, and Main Drainage Canal are listed for diazinon. The lower Feather River is listed for diazinon, chlorpyrifos, Group A pesticides, and unknown toxicity. Potential sources are primarily agriculture.

Colusa Basin Subwatershed. The Colusa Basin Subwatershed encompasses portions of Colusa County and Glenn County. The major land use is agriculture, with major crops including rice, almonds, prunes, walnuts, wheat, pasture alfalfa/hay, corn, and row crops (tomatoes, melons, squash, beets and cucumbers). The Colusa Basin Subwatershed has two 303(d) listed waterbodies with several constituents potentially from agricultural sources. The Colusa Basin Drain is listed for azinphos-methyl, carbofuran, diazinon, malathion, methyl parathion, molinate/ordram, Group A pesticides, and unknown toxicity, and Jack Slough is listed for diazinon.

Solano/Yolo Subwatershed. This subwatershed encompasses portions of Solano and Yolo Counties. Variable topography includes steep, mountainous uplands, low well-rounded hills, and level soils suitable for irrigated crops or dry farming. The major land uses are agriculture and grazing. The major irrigated crops include field crops such as alfalfa hay, wheat, field corn, sorghum/milo and safflower for oil. The minor irrigated crops include walnuts, grapes, prunes, almonds, vegetables (predominately processing tomatoes), seeds (dry beans and sunflowers), and nursery stock. Pesticide usage in this subwatershed is ranked 19th in Yolo County and 29th in Solano County, out of 58 counties. Both aerial and ground applications of pesticides are utilized.

Various management practices are being implemented within the Yolo/Solano Subwatershed. Examples include slough restoration, winter cover cropping (reduces storm water runoff as well as the associated sediments) and tailwater ponds and sediment traps, which, when properly maintained, can capture suspended solids from irrigation runoff.

There is currently one water body that is CWA 303(d) listed for constituents that could be affected by irrigated agriculture in this Subwatershed. Cache Creek (Clear Lake to the Settling Basin near Yolo Bypass) is listed for unknown toxicity (Table Z1-1).

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El Dorado Subwatershed. The El Dorado Subwatershed is located within El Dorado County. Approximately half of the watershed is designated as National Forest, which includes timber harvest activities. Agricultural use occurs on slightly less than 4,000 acres, with the majority of acreage planted in wine grapes. Apples are the second largest crop after wine grapes, followed by pears, walnuts, cherries, peaches and plums. In addition, approximately 500 acres are planted in conifer trees that are sold during the holidays. There are no aerial applications of pesticides in El Dorado County.

Major drainages include the South Fork American River and the North and Middle Forks of the Cosumnes River. The lower American River is currently on the 303(d) list of impaired waterbodies for unknown toxicity. Soil erosion is naturally occurring in this area, but can be exacerbated by agricultural practices if growers are not proactive. There are various management practices, such as cover crops and proper maintenance of irrigation systems, which can help to control excessive land disturbances.

Lake/Napa Subwatershed. Portions of Lake County and Napa County encompass this subwatershed. The major land uses include pasture, rangeland, vineyards and orchards. The major agricultural crops include cattle, field and seed crops, wine grapes, pears, walnuts and nursery products, with minor crops such as apples, peaches, strawberries, melons, vegetables, eggs, cheese, wool and timber. There has been a recent increase in the number of registered organic growers in this area.

This subwatershed contains two CWA 303(d) listed waterbodies: Cache Creek (which originates from Clear Lake) is listed for unknown toxicity and Clear Lake is listed for nutrients. Soil erosion is a naturally occurring problem in this area and can be exacerbated by agricultural practices if growers are not proactive.

Pit River Subwatershed. The Pit River Subwatershed is located primarily in Modoc County with additional acreage in Lassen, Siskiyou and Shasta counties. The major drainages include the Fall River and the North and South Forks of the Pit River. Elevation differences in this watershed are dramatic, with the Warner Mountains at 9,800 feet and the Fall River Valley at 3,200 feet. Major land uses include grazing and timber harvest. Common crops produced in the Pit River Subwatershed include: alfalfa hay, alfalfa/orchard grass hay, timothy hay, assorted grass hay, oats, barley, wheat, potatoes, irrigated pasture, strawberries, nursery plants, wild rice, peppermint, garlic, onions, and various vegetable seeds. Pesticide usage in this area is ranked 37 out of 58 in the state.

There are two 303(d) listed waterbodies within this subwatershed: the Fall River for sedimentation/siltation and the Pit River for nutrients, organic enrichment/low dissolved oxygen, and elevated water temperature (Table Z1-1).

Placer/Nevada/S.Sutter/N.Sacramento Subwatershed. This subwatershed (PNSSNS) encompasses portions of four counties: Placer, Sacramento, Sutter and El Dorado. The major land uses include agriculture, grazing and timber

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harvest. Placer County crops include fruit and nut crops, rice, pasture, and hay. Northern Sacramento County produces wine grapes, market milk, nursery stock, orchard crops (apples, oranges, peaches, plums, pears and walnuts), poultry, field corn, calves and cattle, silage corn, rice and processing tomatoes.

The main drainages are the American River and the Sacramento River. The PNSSNS Subwatershed contains eight waterbodies that are 303(d) listed, with agriculture identified as the potential source of contamination. The Lower Bear River, Chicken Ranch Slough, Strong Ranch Slough, and Arcade Creek are listed for diazinon. The Natomas East Main Drainage Canal downstream of the confluence with Arcade Creek is listed for diazinon and PCBs, and the Natomas East Main Drainage Canal upstream of the confluence with Arcade Creek is listed for PCBs. Morrison Creek is listed for chlorpyrifos and diazinon, and Wolf Creek is listed for fecal coliform.

Sacramento/Amador Subwatershed. This subwatershed encompasses portions of Sacramento and Amador counties. Crops produced include: wine grapes, citrus, mixed pasture, corn (field and silage), grain and hay, alfalfa, walnuts, rice, tomatoes, nursery stock, calves and carrel, poultry and safflower. The two main drainages are the Mokelumne River and its major tributary, the Cosumnes River. The Cosumnes River contains three segments: the Lower, Middle and Upper Forks. The main tributaries to the Cosumnes River are Deer Creek and Laguna Creek. There are three CWA 303(d) listed waterbodies in the Sacramento/Amador Subwatershed: Elder Creek and Elk Grove Creek are listed for diazinon, and Lower Bear River Reservoir is listed for copper.

Shasta/Tehama Subwatershed. Portions of Shasta and Tehama Counties encompass this subwatershed. The major land use is agriculture, which includes pasture, orchards, field and forage crops, row crops, and vineyards. Major crop types are irrigated and non-irrigated pasture, alfalfa/grass and small grains, walnuts, prunes/plums, almonds, olives, corn, dry beans, wheat, rice, and grapes. Clover Creek, Oak Run Creek and South Cow Creek are CWA 303(d) listed for fecal coliform (Table Z1-1). Potential sources may include agriculture and grazing.

Upper Feather River Subwatershed. Nevada, Plumas and Sierra Counties make up this subwatershed. Water bodies include Spanish and Greenhorn Creeks, which converge and drain into the East Branch of the North Fork of the Feather River. The Indian Valley watershed is also located on the East Branch of the North Fork of the Feather River. Indian, Lights and Wolf Creeks converge in Indian Valley and unite with Spanish Creek to form the East Branch of the North Fork of the Feather River.

The major crops consist primarily of alfalfa, hay, and pasture that may be irrigated, non-irrigated, or range. Logging is a major activity within the subwatershed, and is a potential contributor to sediment load in the watershed.

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Goose Lake. The California portion of the Goose Lake Watershed is located in Modoc County. However, a large percentage of the Goose Lake watershed resides in Oregon, which makes watershed management a process that incorporates the jurisdiction of two different state agencies. For the purposes of the Irrigated Lands Program, monitoring will occur at two sites, which are tributaries to Goose Lake and which lie solely within the State of California.

The major land uses include hay and alfalfa production, timber, livestock grazing and a small percentage of orchards. The major agricultural crops include alfalfa hay, orchard grass hay, native meadow hay and irrigated pasture. There are two small orchards (less than 15 acres each), one produces plums and the other produces apples. Soil erosion is a naturally occurring problem in this area and can be exacerbated by agricultural practices if growers are not proactive. There have been various management practices and restoration projects implemented to control excessive land disturbances. Monitoring in this remote watershed began in 2007 during the spring snowmelt season, which is considered the storm runoff for this high elevation watershed.

Monitoring Data Results

Approximate location of sampling sites are shown on Figure Z1-1, MRP Plan Monitoring Sites and Figure Z1-2, Supplemental Monitoring Sites. Supplemental monitoring sites are those sites that were used for the UC Davis Phase I and Phase II studies. Monitoring site identification and the number of tests for toxicity, pesticides or pathogen indicators that were conducted at each site are provided in Table Z1- 2, Summary of Monitoring Site Identification and Number of Tests. The 2007 Review for Zone 1 includes data collected between April 2003 and December 2006.

Table Z1-2
Summary of Monitoring Site Identification and Number of Tests
2003 through 2006

Site ID	Site Name	Subwatershed	No. of Sediment Toxicity Tests	No. of Water Flea Tests	No. of Algae Tests	No. of Minnow Tests	No. of Pesticide Tests	No. of Bacteria Tests
1	Lassen Creek Above Railroad Trestle	Goose Lake	0	0	0	0	0	0
2	Willow Creek Above County Rd 46 Bridge	Goose Lake	0	0	0	0	0	0
3	Butte Slough at Lower Pass Rd (BS1)	Butte/Yuba/Sutter	4	18	21	19	13	0
4	Colusa Basin Drain #5 (CBD5)	Colusa Basin	4	18	21	19	13	0
5	Colusa Basin Drain above Knights Landing (CBD1)	Colusa Basin	4	18	21	19	13	0
6	Jack Slough Site (JS)	Colusa Basin	2	10	10	10	7	0
7	Lower Coon Creek	Placer/Nevada/Sutter/Nsac	2	8	9	9	6	0
8	Sacramento Slough Bridge (SSB) ¹	Butte/Yuba/Sutter	4	18	21	19	13	0
9	Anderson Creek at Ash Creek Rd	Shasta/Tehama	2	6	5	7	7	7

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Site ID	Site Name	Subwatershed	No. of Sediment Toxicity Tests	No. of Water Flea Tests	No. of Algae Tests	No. of Minnow Tests	No. of Pesticide Tests	No. of Bacteria Tests
10	Big Indian Creek at Bridge	Sacramento/Amador	1	3	2	3	3	2
11	Burch Creek at Woodson Ave Bridge	Shasta/Tehama	1	7	4	5	4	4
12	Burch Creek west of Rawson Rd	Shasta/Tehama	0	1	0	1	2	1
13	Butte Creek at Gridley Rd Bridge	Butte/Yuba/Sutter	3	9	9	10	11	12
14	Butte Slough at Pass Rd	Butte/Yuba/Sutter	2	8	7	7	14	6
15	Capell Creek upstream from Lake Berryessa	Lake/Napa	0	0	0	0	0	5
16	Colusa Drain above Knights Landing	Colusa Basin	0	0	0	0	0	1
17	Colusa Drain near Maxwell Rd	Colusa Basin	2	10	8	11	12	11
18	Coon Creek at Striplin Rd	Placer/Nevada/Sutter/Nsac	2	8	8	8	15	15
19	Cosumnes River at Twin Cities Rd	Sacramento/Amador	2	6	6	6	12	6
20	Dry Creek at Alta Mesa Rd	Sacramento/Amador	2	7	6	7	0	7
21	Fall River at Fall River Ranch Bridge	Pit River	0	2	2	2	2	9
22	Gilsizer Slough	Butte/Yuba/Sutter	2	7	7	7	7	7
23	Indian Creek at Arlington Bridge	Upper Feather River	0	4	4	4	0	0
24	Indian Creek downstream from Indian Valley	Upper Feather River	0	0	0	0	0	8
25	McGaugh Slough at Finley Rd East	Lake/Napa	1	4	3	4	4	4
26	Middle Fork Feather River at County Rd A-23	Upper Feather River	0	4	4	4	0	8
27	North Canyon Creek	El Dorado	2	9	8	9	10	11
28	Pine Creek at Nord Gianella Rd	Butte/Yuba/Sutter	1	5	5	5	9	8
29	Pit River at Canby Bridge	Pit River	0	4	4	4	2	9
30	Pit River at Pittville	Pit River	0	4	4	4	2	12
31	Pope Creek upstream from Lake Berryessa	Lake/Napa	0	0	0	0	0	5
32	Rough and Ready Pumping Plant (Rd 108)	Solano/Yolo	2	9	8	8	15	15
33	Sacramento Slough (SRWP station)	Butte/Yuba/Sutter	0	0	0	0	0	1
34	Shag Slough at Liberty Island Bridge	Solano/Yolo	3	9	9	10	10	10
35	Spanish Creek above confluence with Greenhorn Creek	Upper Feather River	0	0	0	0	0	8
36	Spanish Creek below confluence with Greenhorn Creek	Upper Feather River	0	4	4	4	0	0

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Site ID	Site Name	Subwatershed	No. of Sediment Toxicity Tests	No. of Water Flea Tests	No. of Algae Tests	No. of Minnow Tests	No. of Pesticide Tests	No. of Bacteria Tests
37	Stone Corral Creek	Colusa Basin	3	10	9	11	12	12
38	Stony Creek on Hwy 45 near Rd 24	Colusa Basin	4	8	8	8	15	8
39	Toe Drain at NE corner of Little Holland	Solano/Yolo	0	2	2	2	2	2
40	Tule Canal at I-80	Solano/Yolo	2	8	6	8	5	15
41	Ulati Creek at Brown Rd	Solano/Yolo	2	7	7	7	7	7
42	Wadsworth Canal at South Butte Rd	Butte/Yuba/Sutter	1	8	8	8	15	14
43	Z Drain - Dixon RCD	Solano/Yolo	4	14	15	15	14	12
	Coalition Monitoring Site Subtotals		64	277	275	284	276	262
44	Antelope Creek at Kansas Ave	Shasta/Tehama	0	6	6	6	10	0
45	Bear River at Pleasant Grove Rd	Butte/Yuba/Sutter	1	4	4	4	4	0
46	Big Chico Creek at Grape	Butte/Yuba/Sutter	1	0	0	0	0	0
47	Butte Creek at Durnel Dr.	Butte/Yuba/Sutter	1	0	0	0	1	0
48	Butte Creek at Gridley Rd	Butte/Yuba/Sutter	0	4	4	4	4	0
49	Butte Creek on Durham Dayton Hwy	Butte/Yuba/Sutter	1	4	4	4	0	0
50	Butte Slough at Lower Pass Rd	Butte/Yuba/Sutter	0	0	0	0	0	0
51	China Slough at Tehama and Vina Rd	Shasta/Tehama	1	3	3	3	3	0
52	Colusa Basin Drain #5	Colusa Basin	0	0	0	0	0	0
53	Colusa Basin Drain above Knights Landing	Colusa Basin	0	0	0	0	0	0
54	Colusa Drain at Hwy 162	Colusa Basin	1	0	0	0	0	0
55	Comanche Creek (Angel Slough) at Dayton Rd.	Butte/Yuba/Sutter	1	4	4	4	4	0
56	Creek at Hawkins Rd	Solano/Yolo	0	6	0	6	0	0
57	Drain at Mace Blvd	Solano/Yolo	0	5	0	6	0	0
58	Drain at Robben Rd	Solano/Yolo	0	10	0	8	0	0
59	Drain at Robben Rd and Midway Rd	Solano/Yolo	0	8	0	8	0	0
60	Drain at Ulati Creek at Hwy 113	Solano/Yolo	0	8	0	8	0	0
61	Drain South of Rd 14	Solano/Yolo	0	0	0	1	0	0
62	Drain to Walker Cr at County Rd F	Colusa Basin	0	2	2	2	2	0
63	East Drain at 4 Mile Rd	Colusa Basin	0	8	0	8	0	0
64	Gordon Slough at Rd 19	Solano/Yolo	0	8	0	8	0	0
65	Hamilton Slough at Hwy 99	Butte/Yuba/Sutter	1	5	5	5	5	0
66	Jack Slough	Colusa Basin	0	0	0	0	0	0
67	Knight's Landing Ridge	Colusa Basin	0	8	0	8	0	0

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Site ID	Site Name	Subwatershed	No. of Sediment Toxicity Tests	No. of Water Flea Tests	No. of Algae Tests	No. of Minnow Tests	No. of Pesticide Tests	No. of Bacteria Tests
	Cut North at Rd 16							
68	Knight's Landing Ridge Cut South at Rd 16	Colusa Basin	0	7	0	7	0	0
69	Lateral to Gordon Slough at Rd 19	Solano/Yolo	0	9	0	8	0	0
70	Live Oak Slough @ Eager Rd	Colusa Basin	1	0	0	0	0	0
71	Main Drainage Canal at Colusa Hwy	Butte/Yuba/Sutter	0	4	4	4	4	0
72	Mud Creek at Meridian	Butte/Yuba/Sutter	1	0	0	0	0	0
73	Mud Creek at Sacramento Ave	Placer/Nevada/Sutter/Nsac	0	4	4	4	4	0
74	North Main Canal at Sankey Rd	Placer/Nevada/Sutter/Nsac	1	4	4	4	4	0
75	N-S Ditch along Natomas Rd	Placer/Nevada/Sutter/Nsac	1	4	4	4	4	0
76	Sand Creek at Miller Rd	Solano/Yolo	0	7	0	8	0	0
77	Simmerly Slough at Ellis Ave	Colusa Basin	1	4	4	4	4	0
78	Spring Creek at E. Camp Rd	Colusa Basin	0	3	3	3	3	0
79	Spring Creek at Walnut Dr	Colusa Basin	3	13	13	13	20	0
80	Stone Corral Creek at 4 Mile Rd	Colusa Basin	0	8	0	8	0	0
81	Stony Creek at Hwy 45	Colusa Basin	0	4	4	4	4	0
82	Stony Creek at Hwy 32	Colusa Basin	1	0	0	0	0	0
83	Stony Creek on Hwy 45 near Rd 24	Colusa Basin	1	3	3	3	5	0
84	Sycamore Slough at Hwy 45	Solano/Yolo	0	7	0	6	0	0
85	Tributary Home Colony Canal	Colusa Basin	0	4	4	4	4	0
86	Unnamed Canal at Cutting Rd b/t Co. Rd. P and 6th Ave	Shasta/Tehama	1	0	0	0	1	0
87	Unnamed Canal at Hwy 45	Colusa Basin	1	5	5	5	5	0
88	Unnamed Ditch at SW corner of Levee and Riego Rd	Placer/Nevada/Sutter/Nsac	1	3	3	3	3	0
89	Unnamed Drain along Sutter Island X Rd	Sacramento/Amador	1	0	0	0	0	0
90	Unnamed Drain of Walker Creek on Co. Rd. 28	Colusa Basin	2	9	9	9	9	0
91	West Adams Canal at Rd 89	Solano/Yolo	1	5	5	5	5	0
92	West Drainage at Del Paso Rd	Solano/Yolo	0	3	0	3	0	0
93	Willow Slough at Rd 27	Solano/Yolo	0	1	0	1	0	0
94	Willow Slough at Rd 99	Solano/Yolo	1	5	5	5	5	0
95	Winters Canal at Rd 86A	Solano/Yolo	1	4	4	4	9	0

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Site ID	Site Name	Subwatershed	No. of Sediment Toxicity Tests	No. of Water Flea Tests	No. of Algae Tests	No. of Minnow Tests	No. of Pesticide Tests	No. of Bacteria Tests
96	Yankee Slough at Swanson Rd	Butte/Yuba/Sutter	1	5	5	5	5	0
	Supplemental Monitoring Site Subtotals		28	218	115	217	131	0
	TOTALS		92	495	390	501	407	262

Shaded = Sample sites used in Coalition monitoring

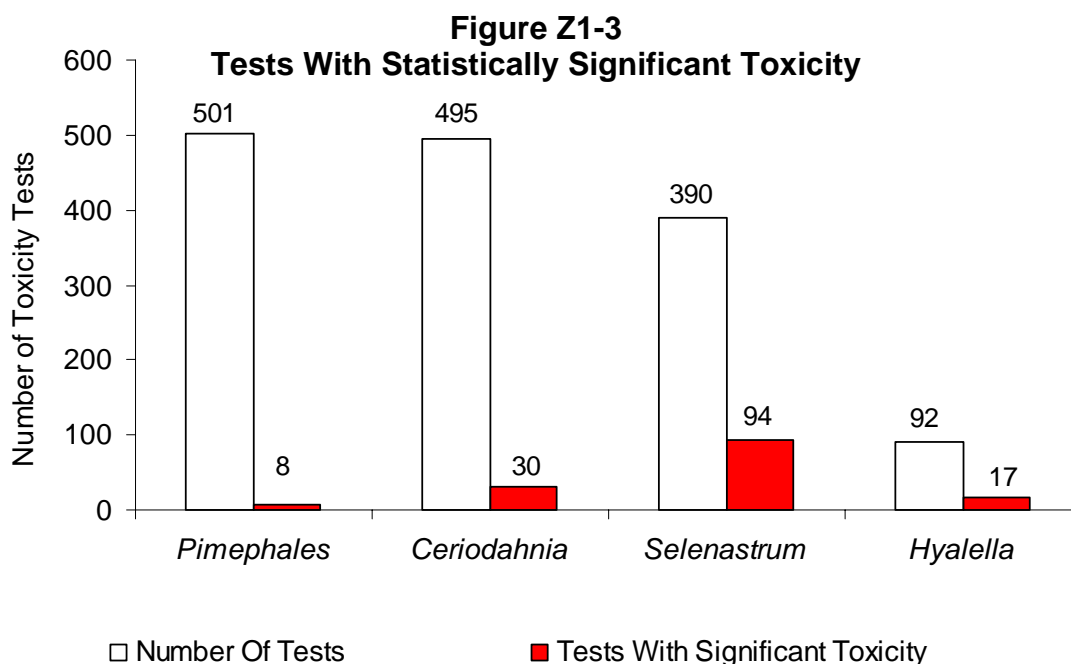
Unshaded = Sample sites used in Supplemental Monitoring

1. Site number 8, Sacramento Slough Bridge, was located at Sacramento Slough near Karnak (SS1) prior to 2005. The site was moved in 2005 for field safety. Results from both sites are combined in this table.

Data summaries for identified general analytical categories are described below. Each section includes a discussion of the frequency of detection and the magnitude of detected constituent measurements, along with notable characteristics pertaining to the results. The summaries include an evaluation of results that exceeded or may have exceeded numeric or narrative water quality objectives. The location or spatial distribution of particular types or ranges of results have been emphasized in some cases, where evaluation of this information is considered critical.

AQUATIC AND SEDIMENT TOXICITY. Samples were collected for all three aquatic species and for one sediment test species. As discussed in the introduction to this 2007 Review, the three different water toxicity test species react differently to different types of stressors. The same stressor will affect more than one species, but those effects will be observed at different concentrations. In some cases, these differences can provide clues to the cause of toxicity.

Figure Z1-3 shows the number of tests with statistically significant toxicity as compared to the number of tests conducted on the four test species.



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The following sections discuss the results for each of the toxicity test species, as well as possible causes for identified toxicity. Tables Z1-3 to Z1-6 present toxicity test results for each species, with results divided into three categories of reduced survival: up to 20%, > 20% to 50%, and > 50%. In the current MRP, a reduction in survival of 50% or greater requires the coalition to perform a TIE, and resampling is required anytime a test is statistically significant. A proposed change in the MRP would not require resampling when reduced survival is $\leq 20\%$, even if it is statistically significant.

Pimephales promelas (fathead minnow). The monitoring results for tests that had toxicity to fathead minnow are summarized on Table Z1-3, and the monitoring locations are depicted on Figure Z1-4, Toxicity to *Pimephales promelas*. There were a total of 8 tests with statistically significant toxicity to fathead minnow. Six of these events were found in the area of Butte/Yuba/Sutter Subwatershed and two on Colusa Basin Subwatershed. Overall, 1.6% percent of the total fathead minnow tests (501 total) showed statistically significant toxicity. Six percent of the individual monitoring locations had toxicity to fathead minnow toxicity at least one time, although monitoring frequency at each site varies.

Table Z1-3
Monitoring Sites with Toxicity to *Pimephales promelas*

					No of Tests - Percent Reduction Compared to Laboratory Control			
Site ID	Site Name	Sample Type	Subwatershed	No of Tests	Up to 20%	>20% to 50%	>50%	Total
3	Butte Slough at Lower Pass Rd (BS1)	MRPPlan	Butte -Yuba-Sutter	19	0	2	0	2
4	Colusa Basin Drain #5 (CBD5)	MRPPlan	Colusa Basin	19	0	0	1	1
55	Comanche Creek (Angel Slough) at Dayton Rd.	Supplemental	Butte-Yuba-Sutter	4	1	0	0	1
65	Hamilton Slough at Hwy 99	Supplemental	Butte-Yuba-Sutter	5	1	0	0	1
73	Mud Creek at Sacramento Ave	Supplemental	Butte-Yuba-Sutter	4	1	1	0	2
90	Unnamed Drain of Walker Creek on Co. Rd. 28	Supplemental	Colusa Basin	9	1	0	0	1
			Total	60	4	3	1	8

Ceriodaphnia dubia (water flea). The monitoring results for tests that had toxicity to water flea are summarized on Table Z1-4, and the locations where these occurred are identified on Figure Z1-5. The table below indicates that 30 sample tests resulted in statistically significant toxicity to water flea, which is 6.1% of the total number of *Ceriodaphnia* tests (495). Water flea toxicity is generally associated with insecticide toxicity. Out of the 96 monitoring locations, 21% had a test result with toxicity to water flea at least one time, although monitoring frequency at each site varied.

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Table Z1-4
Monitoring Sites with Toxicity to *Ceriodaphnia dubia*

Site ID	Site Name	Sample Type	Subwatershed	No. of Tests	No. of Tests with Percent Reduction as Compared to Laboratory Control			
					Up to 20%	>20% to 50%	>50%	Total
3	Butte Slough at Lower Pass Rd (BS1)	MRPPlan	Butte - Yuba - Sutter	18	0	0	2	2
5	Colusa Basin Drain above Knights Landing (CBD1)	MRPPlan	Colusa Basin	18	0	1	0	1
11	Burch Creek at Woodson Ave Bridge	MRPPlan	Shasta - Tehama	7	0	1	3	4
14	Butte Slough at Pass Road	MRPPlan	Butte - Yuba - Sutter	8	0	0	1	1
20	Dry Creek at Alta Mesa Road	MRPPlan	Sacramento - Amador	7	0	1	0	1
22	Gilsizer Slough	MRPPlan	Butte - Yuba - Sutter	7	1	0	0	1
25	McGaugh Slough at Finley Road East	MRPPlan	Lake - Napa	4	0	0	1	1
32	Rough and Ready Pumping Plant (RD 108)	MRPPlan	Colusa Basin	9	0	0	1	1
36	Spanish Creek below confluence with Greenhorn Ck	MRPPlan	Upper - Feather - Yuba	4	0	1	0	1
41	Ulati Creek at Brown Road	MRPPlan	Solano - Yolo	7	0	1	0	1
43	Z Drain – Dixon RCD	MRPPlan	Solano - Yolo	14	0	1	0	1
49	Butte Creek on Durham Dayton Hwy	Supplemental	Butte - Yuba - Sutter	4	0	0	1	1
58	Drain at Robben Rd.	Supplemental	Solano - Yolo	10	0	0	2	2
62	Drain to Walker Cr at County Rd F	Supplemental	Colusa Basin	2	0	0	1	1
69	Lateral to Gordon Slough at Rd. 19	Supplemental	Solano - Yolo	9	0	0	1	1
74	North Main Canal at Sankey Rd.	Supplemental	Placer - Nevada - SSutter - NSac	4	0	0	1	1
78	Spring Creek at E. Camp Rd.	Supplemental	Colusa Basin	3	0	0	1	1
79	Spring Creek at Walnut Drive	Supplemental	Colusa Basin	13	0	0	4	4
88	Unnamed Ditch at SW corner of Levee and Riego Rd	Supplemental	Placer - Nevada - SSutter - NSac	3	0	0	1	1
90	Unnamed Drain of Walker Creek on Co. Rd. 28	Supplemental	Colusa Basin	9	0	0	3	3
			Total	160	1	6	23	30

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Selenastrum capricornutum (algal species). The monitoring results for tests that had toxicity to *Selenastrum* are summarized on Table Z1-5, and the locations where these occurred are identified on Figure Z1-6. The table below indicates that 94 sample tests resulted in statistically significant toxicity to *Selenastrum*, approximately 24.1% of the 390 *Selenastrum* tests. Thirty-six of these *Selenastrum* toxic tests were located in the Butte/Yuba/Sutter Subwatershed. *Selenastrum* is a species that is monitored because of its sensitivity to herbicides and metals. Out of the 96 monitoring locations, 27% had a test result with toxicity at least one time, although monitoring frequency at each site varied. The California Rice Commission is undertaking an expansion of their routine monitoring program in an effort to identify the source of algal toxicity.

Table Z1-5
Monitoring Sites with Toxicity to *Selenastrum capricornutum*

Site ID	Site Name	Sample Type	Subwatershed	No. of Tests	No. of Tests with Percent Reduction as Compared to Laboratory Control			
					Up to 20%	>20% to 50%	>50%	Total
3	Butte Slough at Lower Pass Rd (BS1)	MRPPlan	Butte - Yuba - Sutter	21	0	7	3	10
4	Colusa Basin Drain #5 (CBD5)	MRPPlan	Colusa Basin	21	0	8	3	11
5	Colusa Basin Drain above Knights Landing (CBD1)	MRPPlan	Colusa Basin	21	0	6	4	10
6	Jack Slough Site (JS)	MRPPlan	Butte - Yuba - Sutter	10	0	3	1	4
7	Lower Coon Creek	MRPPlan	Placer - Nevada - SSutter - NSac	9	0	0	2	2
8	Sacramento Slough near Karnak (SS1)	MRPPlan	Butte - Yuba - Sutter	21	0	6	4	10
11	Burch Creek at Woodson Ave Bridge	MRPPlan	Shasta - Tehama	4	0	1	0	1
14	Butte Slough at Pass Road	MRPPlan	Butte - Yuba - Sutter	7	2	0	0	2
28	Pine Creek at Nord Gianella Road	MRPPlan	Butte - Yuba - Sutter	5	0	0	1	1
29	Pit River @ Canby Bridge	MRPPlan	Pit River	5	0	1	0	1
38	Stony Creek on Hwy 45 near Rd 24	MRPPlan	Colusa Basin	8	0	1	0	1
41	Ulati Creek at Brown Road	MRPPlan	Solano - Yolo	7	0	1	0	1
44	Antelope Creek at Kansas Avenue	Supplemental	Shasta - Tehama	6	1	0	0	1
51	China Slough at Tehama and Vina Rd	Supplemental	Shasta - Tehama	3	0	2	0	2
65	Hamilton Slough at Hwy 99	Supplemental	Butte - Yuba - Sutter	5	1	3	0	4
73	Mud Creek at Sacramento Ave	Supplemental	Butte - Yuba - Sutter	4	0	0	1	1
77	Simmerly Slough at Ellis Avenue	Supplemental	Butte - Yuba - Sutter	4	2	2	0	4

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					No. of Tests with Percent Reduction as Compared to Laboratory Control			
Site ID	Site Name	Sample Type	Subwatershed	No. of Tests	Up to 20%	>20% to 50%	>50%	Total
79	Spring Creek at Walnut Drive	Supplemental	Colusa Basin	13	0	3	3	6
83	Stony Creek on Hwy 45 near Rd 24	Supplemental	Colusa Basin	3	0	2	0	2
85	Tributary Home Colony Canal	Supplemental	Shasta - Tehama	4	0	0	1	1
87	Unnamed Canal at Hwy 45	Supplemental	Colusa Basin	5	2	1	0	3
88	Unnamed Ditch at SW corner of Levee and Riego Rd	Supplemental	Placer - Nevada - SSutter - NSac	3	0	3	0	3
90	Unnamed Drain of Walker Creek on Co. Rd. 28	Supplemental	Colusa Basin	9	2	1	0	3
91	West Adams Canal at Road 89	Supplemental	Solano - Yolo	5	1	0	0	1
95	Winters Canal at Road 86A	Supplemental	Solano - Yolo	4	0	0	4	4
96	Yankee Slough at Swanson Road	Supplemental	Placer - Nevada - SSutter - NSac	5	1	4	0	5
			Total	212	12	55	27	94

Hyaella azteca (sediment amphipod). The monitoring results for tests with toxicity to *Hyaella* are summarized on Table Z1-6, and the locations where these occurred are identified on Figure Z1-7. The table below indicates that 17 sediment sample tests resulted in statistically significant toxicity, which is about 18.5% of the 92 *Hyaella* tests. Out of the 96 monitoring locations, 13.5% had a test result with sediment toxicity at least one time, although monitoring frequency at each site varied.

**Table Z1-6
Monitoring Sites with Toxicity to *Hyaella azteca***

					No. of Tests with Percent Reduction as Compared to Laboratory Control			
Site ID	Site Name	Sample Type	Subwatershed	No of Tests	Up to 20%	>20% to 50%	>50%	Total
10	Big Indian Creek at Bridge	MRPPlan	Sacramento - Amador	1	0	1	0	1
19	Cosumnes River at Twin Cities Rd	MRPPlan	Sacramento - Amador	2	2	0	0	2
20	Dry Creek at Alta Mesa Road	MRPPlan	Sacramento - Amador	2	0	0	1	1
27	North Canyon Creek	MRPPlan	El Dorado	2	1	0	0	1
28	Pine Creek at Nord Gianella Road	MRPPlan	Butte - Yuba - Sutter	1	1	0	0	1
34	Shag Slough at Liberty Island Bridge	MRPPlan	Solano - Yolo	3	1	0	0	1
38	Stony Creek on Hwy 45 near Rd 24	MRPPlan	Colusa Basin	4	1	1	0	2

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Site ID	Site Name	Sample Type	Subwatershed	No of Tests	No. of Tests with Percent Reduction as Compared to Laboratory Control			
					Up to 20%	>20% to 50%	>50%	Total
42	Wadsworth Canal at South Butte Rd	MRPPlan	Butte - Yuba - Sutter	1	1	0	0	1
43	Z Drain – Dixon RCD	MRPPlan	Solano - Yolo	4	1	1	1	3
55	Comanche Creek (Angel Slough) at Dayton Rd.	Supplemental	Butte - Yuba - Sutter	1	1	0	0	1
79	Spring Creek at Walnut Drive	Supplemental	Colusa Basin	3	0	0	1	1
89	Unnamed Drain Along Sutter Island X Rd	Supplemental	Sacramento - Amador	1	1	0	0	1
90	Unnamed Drain of Walker Creek on Co. Rd. 28	Supplemental	Colusa Basin	2	0	0	1	1
			Total	27	10	3	4	17

PESTICIDES. Much of the pesticide use is summarized in Appendix B, Crops and Pesticide Use. The quantifiable results as compared to water quality triggers for the more commonly detected pesticides are presented in Table Z1-7. The trigger limits to which results were compared are provided in Appendix A. The approximate locations where these detections occurred are provided in Figure Z1-8. Areas within Zone 1 that could receive prioritized consideration, based on the 2007 Review data, are the following:

- Colusa Basin Subwatershed: Site No. 90 (Un-named Drain of Walker Creek on County Road 28) had multiple significant toxicity results for water toxicity species (fathead minnow, water flea, algal species), as well as one exceedance in sediment toxicity. In addition, multiple pesticide detections that exceeded trigger limits were observed. Site No. 79 (Spring Creek at Walnut Avenue) had multiple toxic results for water flea and algal species, as well as one for sediment toxicity. This monitoring site also had multiple detections of the organophosphate pesticides, diazinon and chlorpyrifos.

- Butte/Yuba/Sutter Subwatershed: Site No. 96 (Yankee Slough at Swanson Road) had multiple detections of chlorpyrifos, diazinon and malathion over the trigger limits. This site also had multiple toxic results for algal species. Site No. 3, Butte Slough at Lower Pass Road, had multiple toxic results for fathead minnow, water flea and algal species.

- Solano/Yolo Subwatershed: Site Nos. 94 and 95 (Willow Slough at Road 99 and Winters Canal at Road 86A) had multiple measurements of organochlorine or organophosphate pesticides, as well as toxicity at site No. 95. Site No. 43, Z-Drain, had multiple toxic results for sediment toxicity, as well as one for water flea.

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Shasta/Tehama Subwatershed: Site No. 11 (Burch Creek at Woodson Avenue Bridge) had multiple toxic results for *Ceriodaphnia* and one measured value of diazinon over the Basin Plan Objective.

**Table Z1-7
Pesticides Tests and Results Greater than Trigger Limits**

Site ID	Site Name	Sample Type	Subwatershed	No. of Tests	Diazinon	Chlorpyrifos	Other	Total
11	Burch Creek at Woodson Ave Bridge	MRP Plan	Shasta - Tehama	4	1	0	0	1
18	Coon Creek at Striplin Road	MRP Plan	Placer - Nevada - SSutter - NSac	15	0	2	0	2
22	Gilsizer Slough	MRP Plan	Butte - Yuba - Sutter	7	1	0	0	1
27	North Canyon Creek	MRP Plan	El Dorado	10	1	0	1	2
28	Pine Creek at Nord Gianella Road	MRP Plan	Butte - Yuba - Sutter	9	1	1	0	2
32	Rough and Ready Pumping Plant (RD 108)	MRP Plan	Colusa Basin	15	0	0	5	5
37	Stone Corral Creek	MRP Plan	Colusa Basin	12	0	1	0	1
38	Stony Creek on Hwy 45 near Rd 24	MRP Plan	Colusa Basin	16	1	1	1	3
42	Wadsworth Canal at South Butte Rd	MRP Plan	Butte - Yuba - Sutter	15	1	0	0	1
44	Antelope Creek at Kansas Avenue	Supplemental	Shasta - Tehama	10	0	1	1	2
45	Bear River at Pleasant Grove Rd.	Supplemental	Butte - Yuba - Sutter	4	0	2	0	2
62	Drain to Walker Cr at County Rd F	Supplemental	Colusa Basin	2	0	1	1	2
71	Main Drainage Canal at Colusa Highway	Supplemental	Butte - Yuba - Sutter	4	1	0	0	1
74	North Main Canal at Sankey Rd.	Supplemental	Placer - Nevada - SSutter - NSac	4	0	0	2	2
75	N-S Ditch along Natomas Rd	Supplemental	Placer - Nevada - SSutter - NSac	4	0	1	1	2
78	Spring Creek at E. Camp Rd.	Supplemental	Colusa Basin	3	1	0	0	1
79	Spring Creek at Walnut Drive	Supplemental	Colusa Basin	30	8	2	2	12
83	Stony Creek on Hwy 45 near Rd 24	Supplemental	Colusa Basin	6	0	1	0	1
87	Unnamed Canal at Hwy 45	Supplemental	Colusa Basin	5	0	0	0	0
90	Unnamed Drain of Walker Creek on Co. Rd. 28	Supplemental	Colusa Basin	10	0	8	1	9
94	Willow Slough at Road 99	Supplemental	Solano - Yolo	5	0	1	9	10
95	Winters Canal at Road 86A	Supplemental	Solano - Yolo	9	9	0	1	10
96	Yankee Slough at Swanson Road	Supplemental	Placer - Nevada - SSutter - NSac	5	1	5	3	9
			Total	204	26	27	28	81

PATHOGENS. Monitoring for *E. coli*, as a pathogen indicator was conducted and data results were compared to the USEPA recommended criteria of 235

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MPN/100 mL. Results of *E. coli* monitoring are depicted on Table Z1-8 and Figure Z1-9. The presence of the pathogen indicator was shown to be ubiquitous and measurements greater than the water quality trigger for the different subwatersheds from the lowest frequency in El Dorado County at 12.5% of the tests exceeding trigger levels up to 43.5% at Shasta Tehama Subwatershed.

The Coalitions within Zone 1 are undertaking a study through University of California at Davis, which will utilize DNA analysis to help determine probable sources of *E. coli* at some of the monitoring locations.

Table Z1-8
Monitoring Results for *Escherichia coli*

Site ID	Site Name	Sample Type	Subwatershed	No. of Tests	No Tests Greater than Trigger Limit
9	Anderson Creek at Ash Creek Road	MRP Plan	Shasta/Tehama	7	6
10	Big Indian Creek at Bridge	MRP Plan	Sacramento/Amador	2	1
11	Burch Creek at Woodson Ave Bridge	MRP Plan	Shasta/Tehama	4	2
13	Butte Creek at Gridley Rd Bridge	MRP Plan	Shasta/Tehama	12	2
14	Butte Slough at Pass Road	MRP Plan	Butte/Yuba/Sutter	6	1
15	Capell Creek upstream from Lake Berryessa	MRP Plan	Lake/Napa	5	1
16	Colusa Drain above Knights Landing	MRP Plan	Colusa Basin	1	1
17	Colusa Drain near Maxwell Road	MRP Plan	Colusa Basin	11	5
18	Coon Creek at Striplin Road	MRP Plan	Colusa Basin	15	9
19	Cosumnes River at Twin Cities Rd	MRP Plan	Placer/Nevada/Sutter/Nsac	6	1
20	Dry Creek at Alta Mesa Road	MRP Plan	Sacramento/Amador	7	1
22	Gilsizer Slough	MRP Plan	Sacramento/Amador	7	2
24	Indian Creek downStream from Indian Valley	MRP Plan	Upper Feather River	8	1
25	McGaugh Slough at Finley Road East	MRP Plan	Lake Napa	4	3
26	Middle Fork Feather River at County Road A-23	MRP Plan	El Dorado	8	1
27	North Canyon Creek	MRP Plan	Butte/Yuba/Sutter	11	2
28	Pine Creek at Nord Gianella Road	MRP Plan	Butte/Yuba/Sutter	8	2
29	Pit River @ Canby Bridge	MRP Plan	Pit River	9	3
31	Pope Creek upstream from Lake Berryessa	MRP Plan	Lake/Napa	5	1
32	Rough and Ready Pumping Plant (RD 108)	MRP Plan	Solano/Yolo	15	2
35	Spanish Creek above confluence with	MRP Plan	Upper Feather River	8	3

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Site ID	Site Name	Sample Type	Subwatershed	No. of Tests	No Tests Greater than Trigger Limit
	Greenhorn Ck				
37	Stone Corral Creek	MRP Plan	Colusa Basin	12	2
38	Stony Creek on Hwy 45 near Rd 24	MRP Plan	Colusa Basin	8	1
39	Toe Drain at NE corner of Little Holland	MRP Plan	Solano/Yolo	2	1
40	Tule Canal at I-80	MRP Plan	Solano/Yolo	15	4
41	Ulati Creek at Brown Road	MRP Plan	Solano/Yolo	7	4
42	Wadsworth Canal at South Butte Rd	MRP Plan	Butte/Yuba/Sutter	14	4
43	Z Drain – Dixon RCD	MRP Plan	Solano/Yolo	12	8
			Total	229	74

DATA GAPS. Monitoring frequency varies significantly for different Coalitions within Zone 1. For example, there are no available monitoring results for this 2007 review for the Goose Lake Coalition area. While there is significant data available for the Sacramento Valley Water Quality Coalition area, the number of data points varies from subwatershed to subwatershed.

There were several monitoring results for metals, which were not accompanied by hardness data. Hardness provides critical information to be able to evaluate aquatic life protection for some metals. Staff did conduct some review and evaluated the likely hardness value that would be necessary to cause an exceedance in the measured value of metals. In all cases, it would have been unlikely that the water would be sufficiently soft to cause metal toxicity.

There are areas to the north of Cache Creek in Lake and Napa Counties, west of the Colusa Drain in Yolo County, and in the Pit and Fall Rivers region that remain unmonitored at this time. The southern areas of Solano County also remain unmonitored, but urban and industrial effects will make it challenging to locate sites that represent primarily agricultural influences. Water Board staff will evaluate these areas during the next site selection process.

Background levels for certain parameters will need to be evaluated in order to determine if agriculture is contributing to the measured values that exceed water quality triggers. For example, boron is naturally occurring in the Solano/Yolo subwatershed but it has yet to be determined through analysis and data accumulation as to whether or not agricultural practices are contributing to the problem. Agriculture contributions could occur through soil amendment additions for alfalfa and other crops, or by the use of well water for irrigation. A Management Plan effort has been initiated by the Sacramento Valley Coalition to address this question.

Detections of *E.coli* occur throughout Zone 1, and identification of the sources is necessary. Coalitions are also conducting studies to help interpret DNA

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information that could identify sources of the pathogen indicator for the locations that have been monitored.

Zone 1 Summary

The following summarizes monitoring performed in Zone 1:

There were 501 toxicity tests performed on *Pimephales promelas* (fathead minnow) of which 8 were found to be toxic, or 1.6%. The number of monitoring sites that had fathead minnow toxicity, out of the total number of sites tested was 8.0% (6 out of 76 sites).

There were 495 tests performed for *Ceriodaphnia dubia* (water flea), of which 29 were toxic to the water fleas, or 6.1%. Out of the total number of sites tested, 26.7% (20 out of 75 sites) of the monitoring sites indicated toxicity to the water flea.

For *Selenastrum capricornutum* (algal species), a total of 390 tests were performed with 94 showing toxicity at 26 sites, or 24.1%. Out of the total number of sites monitored, 41% were toxic to algae (24 out of 59 sites).

Toxicity for *Selenastrum* is generally indicative of herbicide or metal toxicity. At some sites in 2006, metals were analyzed with *Selenastrum* toxicity. There was no identified correlation between metals analyzed and algae toxicity, in part because of the limited information available via toxicity identification evaluation (TIE), or simultaneous herbicide and metals measurements. There is some inconclusive TIE information that indicates a non-polar organic with a short half-life as the contaminant for some of the toxicity. The California Rice Commission in Zone 1 is developing an alternative approach to identifying algae toxicity.

Sediment toxicity is high compared to the number of samples taken. Pyrethroids are suspected, based on studies conducted by the University of California. There were 92 sediment samples collected for testing with *Hyalella azteca* with 17 samples showing toxicity at 13 sites, or 18.5%. Out of the total number of sites monitored, 25% showed sediment toxicity (13 out of 52 sites).

Pesticides were measured at values greater than trigger limits 81 times in Zone 1, which is approximately 20% of 407 pesticide sampling events. Most of these measurements were for diazinon and chlorpyrifos for which the numerical objectives were exceeded 26 and 27 times, respectively.

Of the 229 *E. coli* samples collected, 74 were greater than the water quality trigger of 235 MPN/100mL, which is approximately 28.2% of 262 tests. The Sacramento Valley Water Quality Coalition in Zone 1 has joined efforts with a research project being conducted at the University of California to utilize DNA information as an aid for source identification.